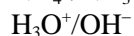
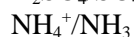
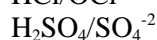


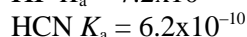
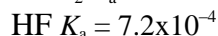
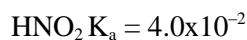
Weak Acid and Base pH Calculations

1. What are the generic forms for the equilibrium constant of an acid and a base?
2. What are the three (3) components of an ICE table?
3. What is meant by equilibrium?
4. What is the quadratic equation?
5. When do we use the quadratic equations?

6. Which of the following is a conjugate acid/base pair?



7. Using the following K_a values, indicate the correct order of base strength.



8. Calculate the pOH of a 0.10 M solution of Ba(OH)₂.
9. What is the H⁺ concentration and pH of a 0.10 M solution of hypochlorous acid, HOCl?
 $K_a = 3.5 \times 10^{-8}$
 $\text{HOCl} \rightarrow \text{H}^+ + \text{OCl}^-$
10. In a solution of acetic acid, the equilibrium concentrations are found to be [CH₃COOH] = 1.000; [CH₃COO⁻] = 0.0042. Evaluate the pH of this solution and the equilibrium constant of ionization of acetic acid. $\text{CH}_3\text{COOH} \rightarrow \text{H}^+ + \text{CH}_3\text{COO}^-$
11. Vinegar is a dilute water solution of acetic acid with small amounts of other components. Calculate the pH of bottled vinegar that is 0.667 M HC₂H₃O₂, assuming that none of the other components affect the acidity of the solution. $K_a = 1.8 \times 10^{-5}$
12. Hydrofluoric acid is used to make chlorofluorocarbons (CFCs), to etch glass, and in processing uranium for nuclear power plants. Calculate the pH of a 1.5 M HF solution. $K_a = 7.2 \times 10^{-4}$
13. What is the OH⁻ concentration and pH of a 0.10 M solution of NH₃? $K_b = 1.8 \times 10^{-5}$
14. For nitrous acid, HNO₂, $K_a = 4.0 \times 10^{-4}$. Calculate the pH of 0.25 M HNO₂.
15. Determine the molarity of a solution of the weak acid HClO₂ ($K_a = 1.10 \times 10^{-2}$) if it has a pH of 1.25.
16. The pain killer morphine is a weak base when added to water. The reaction produces one mole of hydroxide ions for every one mole of morphine that dissolves. The K_b is 1.60×10^{-6} . What is the pH of a 5.00×10^{-3} M solution of morphine?

17. A 10-mL sample of tartaric acid is titrated to a phenolphthalein endpoint with 20. mL of 1.0 M NaOH. Assuming tartaric acid is diprotic, what is the molarity of the acid?
18. If 25 mL of 0.75 M HCl are added to 100 mL of 0.25 NaOH, what is the final pH (hint find $[\text{OH}^-]$ and $[\text{H}^+]$ and use the difference to find pH – they neutralize in a 1:1 ratio)?
19. The pH in a 0.25 M solution of the acid HBrO is 4.65. Using this, calculate the value of K_a for the acid HBrO?
20. What is the K_b of a solution of XOH if the concentration of the solution is 1.0 and the $[\text{OH}^-]$ is 5.4×10^{-2} ? What is the pH?